REMARKS

Claims 1-13 were pending. Claims 1-4 and 9 have been amended, and claims 11 and 12 have been canceled; leaving claims 1-10 and 13 for consideration in the present amendment.

Claims 1-4 have been amended so as to define R of the respective compounds of formulas (10) – (13) as a hydrogen atom on the thiazole ring (i.e., the thiazole ring is unsubstituted). Similarly, Claim 9 has been amended such that the R group as depicted in formulas (1), (1-3), (1-4), (2), (2-3), 2-4), (3), (3-3), 3-4), (4), (4-3), or (4-4) represents a hydrogen atom. Claims 1 and 9 have been further amended to include the feature that at least one of n1, n2, and n3 of formulas (10), (1), (2), (3), and (4) is an integer of 1 or more.

Support for the feature that at least one of n1, n2, and n3 of formulas (10), (1), (2), (3), and (4) is an integer of 1 or more can be found in original claim 5, . No new matter has been entered by way of amendment.

Favorable reconsideration of the pending claims is respectfully requested in view of the following remarks.

Claim Rejection under 35 USC 102

A. Claims 1-13 stand rejected as anticipated under 35 USC 102(b) or, in the alternative, under 35 USC 103(a) as obvious over Yamamoto et al. (JP09-077854). Applicants respectfully traverse.

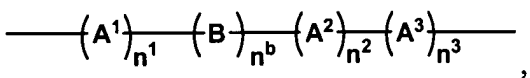
To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Barient, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 1007 (1988).

Yamamoto discloses a polymer containing a repeat unit of 2, 2'-bithiazole-5,5'-diyl or 5,5'-bithiazole-2,2'-diyl, the polymer containing no groups other than 2,2'-bithiazole-5'5'-diyl or 5, 5'-bithiazole-2,2'diyl in the molecule, wherein at least one of the substituents of the thiazole ring in a repeating unit has an alkyl group having 4 or more carbon atoms. Applicant's claims, as

amended, feature an unsubstituted thiazole ring. Since Yamamoto fails to disclose, expressly or inherently, a compound including an unsubstituted thiazole ring, there can be no anticipation. Moreover, the claimed substructure includes at least one group (at least one of A1, A2 and A3) other than the unit having an unsubstituted thiazole ring ("B").

A *prima facie* case of obviousness has not been established because there is no teaching or suggestion of compound having a substructure represented by Formula (10):

Formula (10)



wherein B represents a unit having an unsubstituted thiazole ring, A^1 and A^2 each independently represent a unit having an alkyl group as a substituent, A^3 represents a divalent linking group, n^b represents an integer of 1 - 20, n^1 and n^2 each independently represent an integer of 0 - 20, and n^3 represents an integer of 0 - 10, wherein at least one of n^1, n^2, and n^3 is an integer of 1 or more as presented in claim 1.

Yamamoto is fairly explicit that at least one side of its disclosed bithiazole compounds include a long chain alkyl group of four or more carbons as a substituent. Yamamoto requires the long chain alkyl group of four or more carbons presumably to increase solubility in an organic solvent as well as to increase the overall molecular weight. Included in Yamamoto is a comparison of its inventive compounds, wherein R is a long chain alkyl group greater than 4 carbons with a comparative example 1 that includes a methyl substituent (R = methyl). Yamamoto concluded that when R is less than four carbon atoms in length, solubility in organic solvents was undesirable and the compound was rendered unsuitable for its purpose. As such, Yamamoto teaches away from the claimed unsubstituted thiazole compounds. Moreover, it is well settled law that "[i]f the proposed modification would render the prior art invention being modified unsatisfactorily for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon* 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The courts have also held that '[i]f the proposed modification or combination of the prior art would

change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious.'" *In re Ratti* 270 F. 2d 810, 123 USPQ 349 (CCPA 1959). Cleary, thiazole compounds that are not substituted or substituted with less than 4 carbon atoms would change the principle of operation since the stereoregularity would change due to the sterically hindered alkyl groups.

With regard to Claim 9, the thiazole moiety of formulas (1), (1-3), (1-4), (2), (2-3), (2-4), (3), (3-3), (3-4), (4), and (4-3) are unsubstituted and the comments above are applicable. Formulas (1-2), (2-2), and (3-2) are patentably distinguished from Yamamoto since there is no disclosure of a divalent linking group A^3. Rather, Yamamoto teaches and suggests a poly(2,2'-bitiazol-5,5'-diyl) polymer bearing a long chain alkyl group. There is no teaching or suggestion of the divalent linking group within the polymer.

As shown in Applicant's experimental results in Tables 1, 2, and 3, the organic semiconductor materials of the present invention exhibit improved properties such as mobility, and ON/OFF ratios (after preparation and after aging one month). When the TFT element 14 shown in Table 2 of the application contained compound (29) (see Applicant's specification, page 32; compound contained alkyl substituted thiazole groups linked to an unsubstituted bithiazole group) was compared with TFT element 12 containing compound (23) (see Applicant's specification, page 31; compound contained an alkyl substituted bithiazole group), the results clearly demonstrate that the TFT containing compound (29) was markedly superior to the TFT containing compound (23) in terms of improved mobilities and higher ON/OFF ratios (both just after preparation and after 1 month).

The improved mobilities and ON/OFF ratios can be attributed to the presence of the unsubstituted bithiazole unit of compound (29) and not the increased molecular weight relative to compound (23). In support of this conclusion is a comparison of a TFT containing compound (23) with a TFT containing compound (24). Compound (24) has a structure similar to that of compound (23) but a higher average molecular weight of 80,000. In this comparison, compound (24) exhibited lower mobilities and lower ON/OFF ratios when compared to a TFT containing compound (29) indicating that the higher average molecular weight had little or no

effect on mobilities and ON/OFF ratios. Moreover, when compared directly to the TFT containing compound (23) similar mobility properties were observed but the ON/OFF ratios were slightly lower.

While not wanting to be bound by theory, it is believed that the presence of the unsubstituted thiazole within the compound substructure contributed to the higher mobilities and higher ON/OFF ratios results in more compact stacking and shorter intramolecular distances due to the fact that the compound substructure with the unsubstituted thiazole is sterically unhindered because there are no alkyl groups substitution (i.e., R is a hydrogen atom). For example, TFT element 1 in Table 1 included an alkyl substituted hetero ring repeat unit (i.e., thiophene ring) and exhibited a higher stereoregularity due to the interaction of the alkyl groups. However, as shown, TFT elements containing these compounds exhibited lower mobilities, lower ON/OFF ratios, and lower stability.

In view of the foregoing, Yamamoto fails to anticipate and/or render obvious independent Claims 1, 9 and the rejection is requested to be withdrawn. Given that Claims 2-8 and 10-13 depend from Claims 1, 9 and include all of the features therein, these claims are patentable for at least the same reasons.

B. Claims 1-13 stand rejected as anticipated under 35 USC 102(b) or, in the alternative, under 35 USC 103(a) as obvious over Ng et al. et al., "Molecular Diodes Based on Conjugated Diblock Copolymers," J. Am. Chem. Soc. 2002, 124, 11862-11863.. Applicants respectfully traverse.

Ng discloses diblock copolymers consisting of an alkyl substituted thiophene segment and an alkyl substituted thiazole segment. The alkyl substitution is a methyl group. As such, there is no disclosure or suggestion of the unsubstituted thiazoles as claimed nor of a compound substructure that includes divalent linking groups as claimed. For reasons discussed above, a prima facie case of obviousness has not been established because these features are not taught or suggested. Moreover, it is noted that when considering Ng as a whole, this reference teaches and suggests two different conjugated blocks with opposite electronic demands so as to provide a

pseudo p-n junction for hole and electron transport. As such, Ng requires the thiophene segments. Compounds without the thiophene segments would clearly change the principle of operation of the prior art invention as intended by Ng. Thus, as noted above, there can be no motivation or suggestion to make the proposed modification as outlined in the Office Action since doing so would render the prior art invention being modified unsatisfactorily for its intended purpose. The courts have held that '[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious.'" *In re Ratti* 270 F. 2d 810, 123 USPQ 349 (CCPA 1959).

In view of the foregoing, the rejection is requested to be withdrawn

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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